

REMARKS

Claims 1 – 6, 8 – 33 and 36 – 59 are pending, and claims 2, 12 – 15, 17 – 25, 36, 37, 42 – 46, and 50 – 54 remain withdrawn from consideration under the restriction requirements. Claims 26 – 33, 38 – 41, 47 – 49, and 55 – 57 stand rejected under 35 USC § 112. Claims 1, 3 – 6, 8 – 11, 16, 26 – 33, 38 – 41, 47 – 49, and 55 – 59 stand rejected for obviousness under 35 USC § 103.

By the present amendment, claims 26, 33, 38, 42, 47, 50, and 55 are amended. After this amendment, claims 1, 3 – 6, 8 – 11, 16, 26 – 33, 38 – 41, 47 – 49, and 55 – 59 are pending, and claims 2, 12 – 15, 17 – 25, 36, 37, 42 – 46, and 50 – 54 remain withdrawn from consideration.

Rejections under 35 USC § 112

Claims 26 – 33, 38 – 41, 47 – 49, and 55 – 57 stand rejected under 35 USC § 112, second paragraph.

With respect to claims 30, 47, and 55, the Examiner questions how two elements can be partially aligned. Because the reasons are still valid, applicants' earlier arguments are repeated here. Applicants respectfully submit that there is nothing unclear about partial alignment in a claim limitation. As evidence that such a limitation is a known term in the art, applicants note that many issued U.S. patents in the semiconductor field and other similar fields have elements claimed as being "at least partially aligned." Applicants respectfully submit that those skilled in the art would recognize that two elements are at least partially aligned when they are aligned to some extent, but not necessarily completely aligned, e.g., when one element overlays another element to some extent but may leave a portion not overlaid. Examples of alignment that meet the limitation requirement of being "at least partially aligned" are shown in FIGS. 2, 3, 4, 6, and 7 as filed. These drawings show a preferred degree of alignment, thereby also meeting the requirement of disclosing the best mode for realizing the invention.

The Examiner also states that the structural relationships among the storage layer, the layer of silicon-rich insulator, and the memory cell are unclear. Applicants respectfully submit that each of claims 26, 38, 47, and 55 clearly states a series of fabrication steps. If the claimed steps are performed by a person skilled in the art, the structures formed will be the structural embodiments shown in the drawings or their equivalents (applicants' specification as filed at page 15 line 1 through page 18 line 23, i.e. paragraphs [0055] – [0064] of the published application, and FIGS. 2 – 8 and 16 as filed). FIGS. 2 – 8 clearly show the structural relationships. Thus, again, applicants have fulfilled the requirements of 35 USC § 112.

Nevertheless, to more clearly state and distinctly claim applicants' invention and to expedite prosecution of the application, claims 26, 33, 38, 47, and 55 are amended as recited hereinabove. (Withdrawn claims 42 and 50 are similarly amended.) Basis for the insertions in these claims is found in FIGS. 2 – 8 and 11 as filed. Therefore, withdrawal of the rejections under 35 USC § 112 and allowance of claims 26 – 33, 38 – 41, 47 – 49, and 55 – 57 are respectfully requested.

Rejections under 35 USC § 103 traversed

Claims 1, 3 – 6, 8 – 11, 16, 26 – 33, 38 – 41, 47 – 49, and 55 – 59 stand rejected under 35 USC § 103(a) as unpatentable over Miyasaka (4,476,574) in view of Udayakumar et al. (2005/0012126). These rejections are respectfully traversed.

The Examiner states that it would have been obvious to a person of ordinary skill to use a silicon-rich oxide insulator in each control element of Miyasaka's device to improve the characteristics of the device, and that the combination is motivated by the teachings of Miyasaka "who points out the advantages of using a silicon-rich oxide insulator." However, while Miyasaka teaches polycrystalline silicon layers and silicon oxide films, Miyasaka nowhere mentions a silicon-rich oxide insulator. Therefore, Miyasaka does not teach motivation for the combination. Udayakumar et al. mentions

silicon-rich oxide, referring to it by the term "SILOX," but teaches its use as a *hydrogen barrier* to inhibit diffusion of hydrogen to protect a ferroelectric capacitor from hydrogen (abstract and paragraphs [0007 – 0008]. Thus, the teachings by Udayakumar et al. also do not suggest the use of silicon-rich oxide in a combination with the control element of Miyasaka. Udayakumar et al. does not even mention a control element. If anything in the disclosure of Udayakumar et al. may fairly be called a control element, it is the transistor device 102 described in paragraph [0033], which is unrelated to the silicon-rich oxide. Applicants respectfully submit that a proper *prima facie* case of obviousness has not been made.

Furthermore, no combination of the teachings of Miyasaka with those of Udayakumar et al. would make applicants' memory cell or memory array as claimed. Claim 1 recites, in pertinent part (emphasis added): "each memory cell having exactly two terminals and having a storage element and a control element coupled in series between a row conductor and a column conductor, and *each control element including a silicon-rich insulator.*"

In any combination of the teachings of the two references, the silicon-rich silicon oxide of Udayakumar et al. would not be part of any control element. It would be "situated above or directly over the ferroelectric capacitor structures" (paragraph [0007] and FIGS. 4G, 4H, 7E, 7F, 9B – 9E, 10C, 10D) or as an interlayer dielectric (ILD) (paragraph [0008] and FIGS. 9D, 9E, 10C, 10D) disposed to inhibit diffusion of hydrogen. Again, Udayakumar et al. does not mention silicon-rich silicon oxide in connection with any control element. The silicon-rich oxide of Udayakumar et al. is in a different structure, for a different purpose, with a different result from applicants' invention as claimed. Thus no combination of these references makes the memory array of applicants' claim 1. The same reasoning applies to claims 3 – 6, 8 – 11, 16, 26 – 33, 38 – 41, 47 – 49, and 55 – 59.

Regarding claim 16 in particular, claim 16 recites, in pertinent part (emphasis added): "each memory cell having exactly two terminals, each memory cell comprising means for storing data and *means for controlling the means for storing data, the means for storing data and means for controlling*

being coupled in series between a row conductor and a column conductor, and *each means for controlling including a silicon-rich insulator.*" Again here, the silicon-rich oxide of Udayakumar et al., if combined with Miyasaka, would not be in the means for controlling the means for storing data.

Therefore, withdrawal of the rejections under 35 USC § 103 and allowance of claims 1, 3 – 6, 8 – 11, 16, 26 – 33, 38 – 41, 47 – 49, and 55 – 59 are respectfully requested.

Conclusion

The claims rejected under 35 USC § 112 have been amended. Regarding the claims rejected under 35 USC § 103, applicants respectfully submit that a proper *prima facie* case has not been made, and in any case, the combination suggested by the Examiner would not make applicants' device as claimed. Nevertheless, in order to more clearly state and distinctly claim applicants' invention, the claims are amended as recited in this amendment.

This response is believed to be fully responsive to each issue raised in the office action, but if the Examiner maintains any rejection, applicant would appreciate a more detailed explanation of precisely where in the references the combination is suggested and the relevant limitations are disclosed.

Applicants expressly reserve the right to file divisional and/or continuation applications with any of the canceled or non-elected claims, or with similar claims, or with claims to any subject matter disclosed in the present application or incorporated by reference.

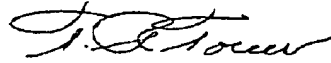
This response is believed to be fully responsive to each issue raised in the office action, but if the Examiner maintains any rejection, applicant would appreciate a more detailed explanation of precisely where in the references a particular combination is suggested and the relevant limitations are disclosed.

Applicants respectfully submit that the claims as amended are patentable over the prior art and that the application is now in condition for allowance, which is respectfully requested.

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Respectfully submitted,

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